

5.3 Full PM₁₀ PSD Increment Consumption Analysis

Although not required by the Wyoming DEQ, Solvay also conducted a PM₁₀ increment consumption analysis to demonstrate compliance with the PM₁₀ Class II PSD increment standards. The methods were the same, except for the modified PM₁₀ emissions, as a previously conducted analysis (*Solvay Minerals Inc., Particulate Matter Impact Analysis Trona Products Expansion, April 2002*). This analysis also includes PM₁₀ increment-consuming emissions from the two nearby facilities (FMC – Westvaco and General Chemical) as recommended by the Wyoming DEQ for the previous analysis.

The Solvay facility-wide and the nearby increment-consuming sources, their PM₁₀ emission rates, and other modeling parameters are listed in Table 5.3. Again, five years (1987 to 1991) of Rock Springs meteorological data were used. The modeling methodology and the assumptions made are the same as in the previous analysis. Further details about the assumptions, the applied methodologies, and data sets used, are provided in the previous report.

The digital modeling files and a copy of the previous analysis report are provided on the attached compact disk.

Table 5.3: Modeled Stack Parameters

Emission Point ID	UTM X (m)	UTM Y (m)	Base Elevation (m)	PM ₁₀ Emission Rate (lb/hr)	PM ₁₀ Emission Rate (g/s)	Stack Height (ft)	Stack Height (m)	Exit Temperature (°K)	Exit Velocity (m/s)	Exit Diameter (m)
Existing Solvay Minerals Emissions Points										
2A	603677	4594992	1900	1.59	0.20	23	7.01	293	15.85	1.06
6A	603893	4594835	1903	0.32	0.04	133	40.54	309	24.99	0.64
6B	603922	4594848	1903	0.48	0.06	15	4.72	297	10.06	0.67
7	604037	4594848	1906	1.19	0.15	82	24.99	293	19.51	0.75
10	603874	4594983	1900	0.24	0.03	13	4.05	293	5.49	0.60
11	603872	4594811	1901	0.24	0.03	35	10.76	293	6.40	0.55
14	603770	4594807	1902	0.40	0.05	125	38.10	293	17.37	0.43
15	603721	4594807	1902	4.36	0.55	180	54.86	347	14.94	1.83
16	603721	4594816	1902	0.87	0.11	126	38.40	369	12.80	1.07
18	603842	4594804	1902	5.00	0.63	180	54.86	325	17.68	2.21
19	603842	4594792	1902	5.00	0.63	180	54.86	322	18.29	2.21
24	603804	4594780	1902	0.32	0.04	25	7.62	302	12.50	0.30
25	603694	4595017	1900	1.03	0.13	76	23.16	293	14.63	0.73
26	603679	4594992	1900	0.56	0.07	67	20.42	311	17.68	0.73
27	603712	4594998	1900	0.48	0.06	60	18.29	293	18.90	0.48
28	603729	4594829	1902	2.93	0.37	140	42.67	347	12.19	1.22
30	603939	4594757	1902	0.24	0.03	88	26.82	293	17.98	0.20
31	603939	4594747	1902	0.24	0.03	88	26.82	293	17.98	0.20
35	603931	4594712	1905	1.43	0.18	103	31.39	327	14.63	0.70
36	603960	4594712	1905	0.08	0.01	60	18.29	338	25.88	0.15

Table 5.3: Modeled Stack Parameters (continued)

Emission Point ID	UTM X (m)	UTM Y (m)	Base Elevation (m)	PM ₁₀ Emission Rate (lb/hr)	(g/s)	Stack Height (ft)	(m)	Exit Temperature (°K)	Exit Velocity (m/s)	Exit Diameter (m)
37	603967	4594712	1905	0.08	0.01	60	18.29	338	25.88	0.15
38	603974	4594712	1905	0.08	0.01	60	18.29	338	25.88	0.15
44	604005	4594752	1905	0.16	0.02	63	19.20	293	17.07	0.30
45	604030	4594847	1906	0.24	0.03	18	5.43	293	8.84	0.27
46	603765	4595011	1900	0.71	0.09	13	3.81	293	14.02	0.67
48	603687	4594848	1902	9.28	1.17	180	54.86	450	9.75	3.20
50	603725	4594848	1902	0.71	0.09	180	54.86	366	8.23	1.37
51	603752	4594829	1902	2.38	0.30	180	54.86	422	10.06	2.44
52	603901	4594864	1903	0.48	0.06	141	42.98	293	15.24	0.46
53	603901	4594848	1903	0.48	0.06	30	9.14	293	10.97	0.85
54	603694	4594986	1900	0.16	0.02	64	19.57	293	24.08	0.18
62	603657	4594740	1900	0.16	0.02	91	27.74	293	33.53	0.15
63	603652	4594740	1900	0.16	0.02	58	17.68	293	35.66	0.15
64	603981	4594700	1905	0.08	0.01	29	8.84	293	29.26	0.15
65	603962	4594700	1905	0.08	0.01	8	2.44	293	11.58	0.23
66	603701	4594758	1902	0.56	0.07	20	6.10	293	22.86	0.30
67	603634	4594808	1902	0.48	0.06	125	38.10	311	10.06	0.46
68	603933	4594829	1905	0.40	0.05	82	24.99	293	23.47	0.37
70	603933	4594817	1905	0.24	0.03	82	24.99	293	14.94	0.40
71	603928	4594817	1905	0.24	0.03	82	24.99	293	14.94	0.40
72	603910	4594706	1905	0.08	0.01	61	18.49	366	16.15	0.20

Table 5.3: Modeled Stack Parameters (continued)

Emission Point ID	UTM X (m)	UTM Y (m)	Base Elevation (m)	PM ₁₀ Emission Rate (lb/hr)	(g/s)	Stack Height (ft)	(m)	Exit Temperature (°K)	Exit Velocity (m/s)	Exit Diameter (m)
73	603894	4594705	1905	0.87	0.11	95	28.96	305	17.07	0.61
76	603598	4595004	1900	2.46	0.31	110	33.53	293	17.22	1.12
79	603491	4595006	1900	0.87	0.11	68	20.73	293	18.26	0.63
80	603685	4594882	1902	12.21	1.54	180	54.86	425	15.49	3.20
81	603786	4594848	1902	0.48	0.06	120	36.58	394	23.29	0.51
82	603760	4594829	1902	3.41	0.43	180	54.86	421	13.15	2.44
83	603916	4594883	1903	0.40	0.05	130	39.62	366	17.47	0.51
85	603687	4594822	1902	0.48	0.06	140	42.67	436	15.24	0.91
88	604030	4594877	1906	0.24	0.03	11	3.35	293	19.51	0.30
90	603965	4594700	1905	0.08	0.01	23	7.01	293	19.20	0.15
91	603960	4594700	1905	0.08	0.01	24	7.32	293	19.20	0.15
92	603983	4594712	1905	0.32	0.04	64	19.51	293	25.91	0.32
93	603992	4594712	1905	0.16	0.02	70	21.34	293	16.15	0.30
94	603984	4594719	1905	0.32	0.04	90	27.43	293	25.91	0.32
95	603988	4594712	1905	0.08	0.01	90	27.43	293	25.91	0.15
96	603943	4594733	1905	0.16	0.02	82	25.00	293	21.94	0.25
97	603942	4594735	1905	0.10	0.01	82	25.00	293	21.94	0.20
98	603942	4594737	1905	0.40	0.05	82	25.00	293	17.07	0.46
99	603663	4595000	1900	3.24	0.41	125	38.10	293	15.24	1.37
Modified Source #17 and New Source #100										
17	603687	4594807	1902	41.1	5.18	180	54.86	477.6	29.15	3.66
100	603681	4594817	1902	0.2	0.02	126	38.4	293	19.4	0.3

Table 5.3: Modeled Stack Parameters (continued)

Emission Point ID	UTM X (m)	UTM Y (m)	Base Elevation (m)	PM ₁₀ Emission Rate (lb/hr)	(g/s)	Stack Height (ft)	(m)	Exit Temperature (°K)	Exit Velocity (m/s)	Exit Diameter (m)
Nearby Increment-Consuming Sources from FMC-Westvaco										
BC1	599153	4608435	1896	3.01	0.38	93	28.35	350	18.63	0.76
BC2	599153	4608484	1896	1.67	0.21	91	27.74	313	10.35	0.76
MONO11	599323	4607941	1896	3.01	0.38	25	7.62	291	20.70	0.76
MONO12	599331	4608374	1896	1.74	0.22	60	18.29	294	17.25	0.91
MW3	599058	4608059	1896	0.24	0.03	130	39.62	339	18.38	1.98
RA29	598812	4608511	1896	0.32	0.04	80	24.38	355	29.51	1.22
Nearby Increment-Consuming Sources from General Chemical										
FD617	603742	4605237	1902	0.24	0.03	4	1.22	286	26.73	0.20
GR3Q	603476	4605127	1902	1.51	0.19	118	35.96	341	13.44	0.91

Table 5.4 shows the modeled maximum annual and the 24-hour highest second-highest (H2H) (on an annual basis from the five years of analysis) PM₁₀ concentrations as a result of Solvay and the nearby sources' increment-consuming emissions. The maximum impacts occur on the property line directly to the east of the plant. Both the maximum annual (9.4 µg/m³) and H2H 24-hour (29.6 µg/m³) concentrations are less than the applicable Class II PSD increments.

Table 5.4: Maximum Predicted PM₁₀ Impacts Compared With PSD Increments

Averaging Time	Maximum Predicted Impacts (µg/m ³)	Date	Receptor Location Easting (m)	Northing (m)	Class II PSD Increment (µg/m ³)
24-hour H2H	29.6	12/26/87	604,400	4,594,850	30
Maximum annual	9.4	1988	604,400	4,594,950	17

Figures 5.2 and 5.3 show the contours of the maximum annual and 24-hour concentrations around the facility. The locations of the two nearby facilities and the receptor grids used in this analysis are also presented. These figures show that the highest impacts are on the property line east of the facility and decrease with distance from the facility.

Figure 5.2: Maximum Annual PM₁₀ Impacts

Figure 5.3: Maximum 24-Hour PM₁₀ Impacts